

Compact, Lightweight, High Voltage Propellant Isolators, Phase II

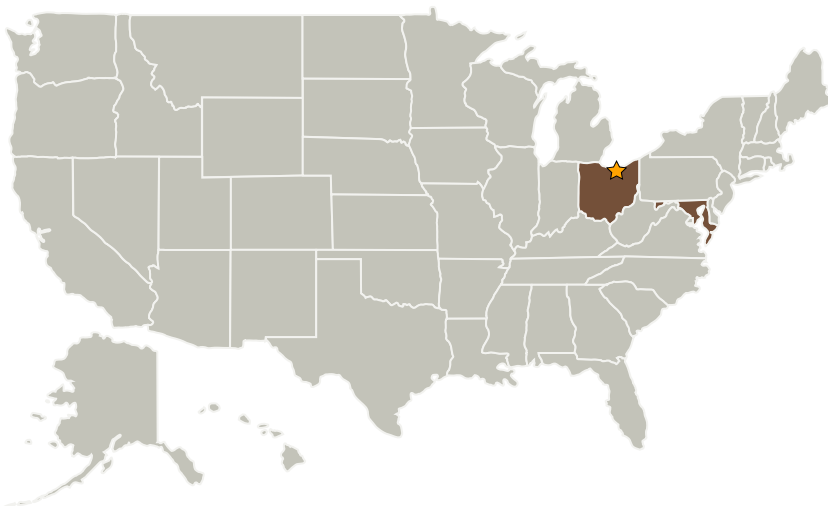
Completed Technology Project (2004 - 2006)



Project Introduction

TA&T, Inc. proposes an enabling fabrication process for high voltage isolators required in high power solar electric and nuclear electric propulsion (SEP and NEP, respectively). Future high thrust, high specific impulse engines will have to support beam voltages up to 10kV to meet performance requirements. If existing isolator designs are simply scaled-up for higher voltages, then a significant mass penalty is incurred. The proposed fabrication approach, known as ceramic stereolithography (CSL), is an automated, layered manufacturing process that enables net shape, monolithic ceramics with complex geometry. The Phase I effort successfully demonstrated fabrication and high voltage testing of three prototype isolator designs that would be very difficult to fabricate using conventional ceramic processing. The Phase II objectives include refinement of the CSL process to the point where it is a reliable fabrication approach for high voltage isolators, development and demonstration of an isolator design with maximum voltage standoff in a minimum volume, assessment life-limiting issues and accelerated life testing. The Phase II project will result in a new fabrication tool for high voltage isolation and insulation components, and a new optimized isolator design suitable for HiPEP and NEXIS ion engines.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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| Organizations Performing Work | Role | Type | Location |
|--|-------------------------|--|---------------------|
| ★ Glenn Research Center(GRC) | Lead Organization | NASA Center | Cleveland, Ohio |
| Technology Assessment & Transfer, Inc. | Supporting Organization | Industry Women-Owned Small Business (WOSB) | Annapolis, Maryland |

Primary U.S. Work Locations

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| Maryland | Ohio |
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.3 Power Management and Distribution
 - └ TX03.3.3 Electrical Power Conversion and Regulation